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Wu et al.

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(54) **CABLE CONNECTOR WITH LOW IMPEDANCE**

(71) Applicant: **FOXCONN INTERCONNECT TECHNOLOGY LIMITED**, Grand Cayman (KY)

(72) Inventors: **Jerry Wu**, Irvine, CA (US); **Jun Chen**, Kunshan (CN); **Xiao Fan**, Kunshan (CN); **Zhi-Yong Zhou**, Kunshan (CN)

(73) Assignee: **FOXCONN INTERCONNECT TECHNOLOGY LIMITED**, Grand Cayman (KY)

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(30) **Foreign Application Priority Data**

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H01R 24/00 (2011.01)
H01R 4/02 (2006.01)
H01R 13/436 (2006.01)

(52) **U.S. Cl.**
CPC ***H01R 4/023*** (2013.01); ***H01R 13/4367*** (2013.01); *H01R 4/027* (2013.01); *H01R 4/028* (2013.01)

(58) **Field of Classification Search**
CPC H01R 4/023; H01R 4/028; H01R 4/027; H01R 13/4367; H01R 27/02; H01R 13/59; H01R 13/6658
USPC 439/676
See application file for complete search history.

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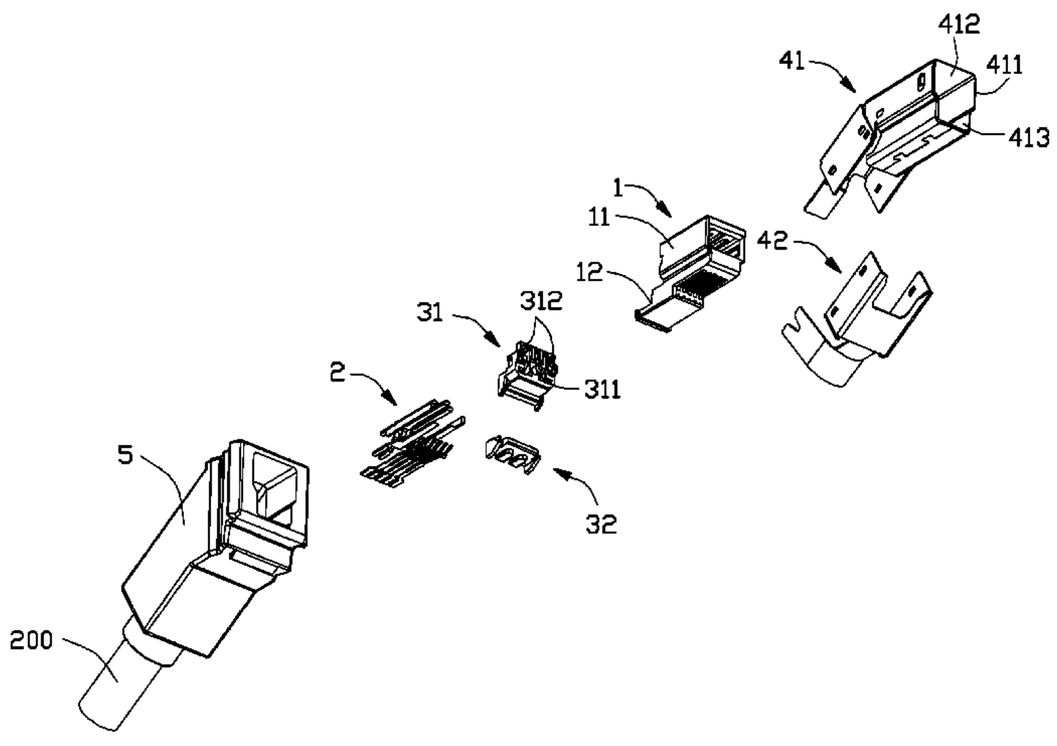
Primary Examiner — Jean F Duverne
(74) *Attorney, Agent, or Firm* — Wei Te Chung; Ming Chieh Chang

(57) **ABSTRACT**

A cable connector for soldering to a cable defining some core wires includes an insulative body, a plurality of terminals, and a spacer. Each terminal includes a soldering portion extending rearwardly out of the insulative body soldering to the core wires. The spacer includes some stalls and a respective receiving slot formed between every two adjacent stalls for receiving the soldering portions. The receiving slot includes a first receiving slot proximal to the insulative body and a second receiving slot distal from the insulative body. The second receiving slot includes a lower receiving space and an upper receiving space with a smaller width. The soldering portion of the terminal includes a first portion received in the lower receiving space and a second portion received in the first receiving slot. The width of the first portion is larger than the width of the second portion to reduce the impedance.

8 Claims, 8 Drawing Sheets



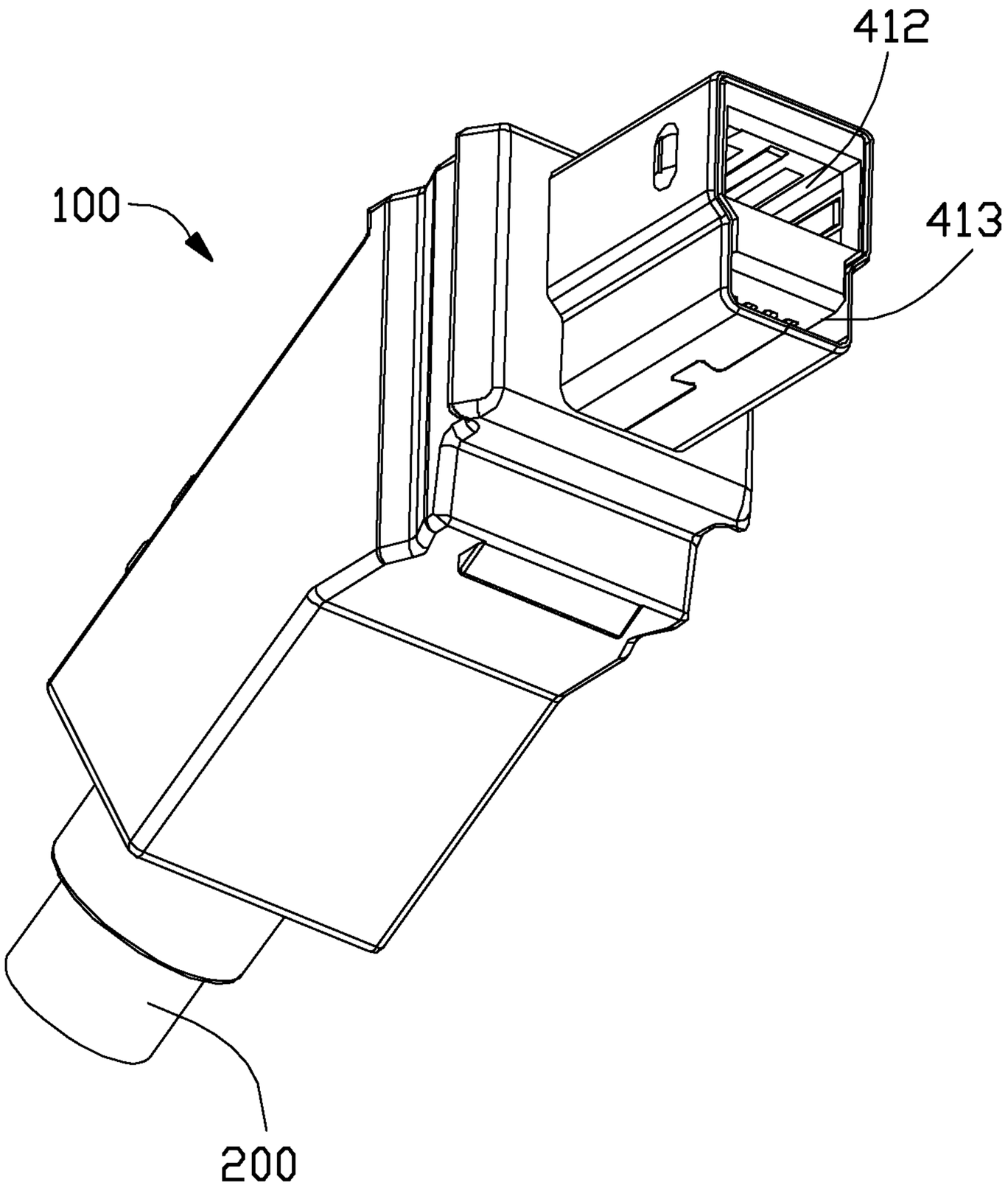


FIG. 1

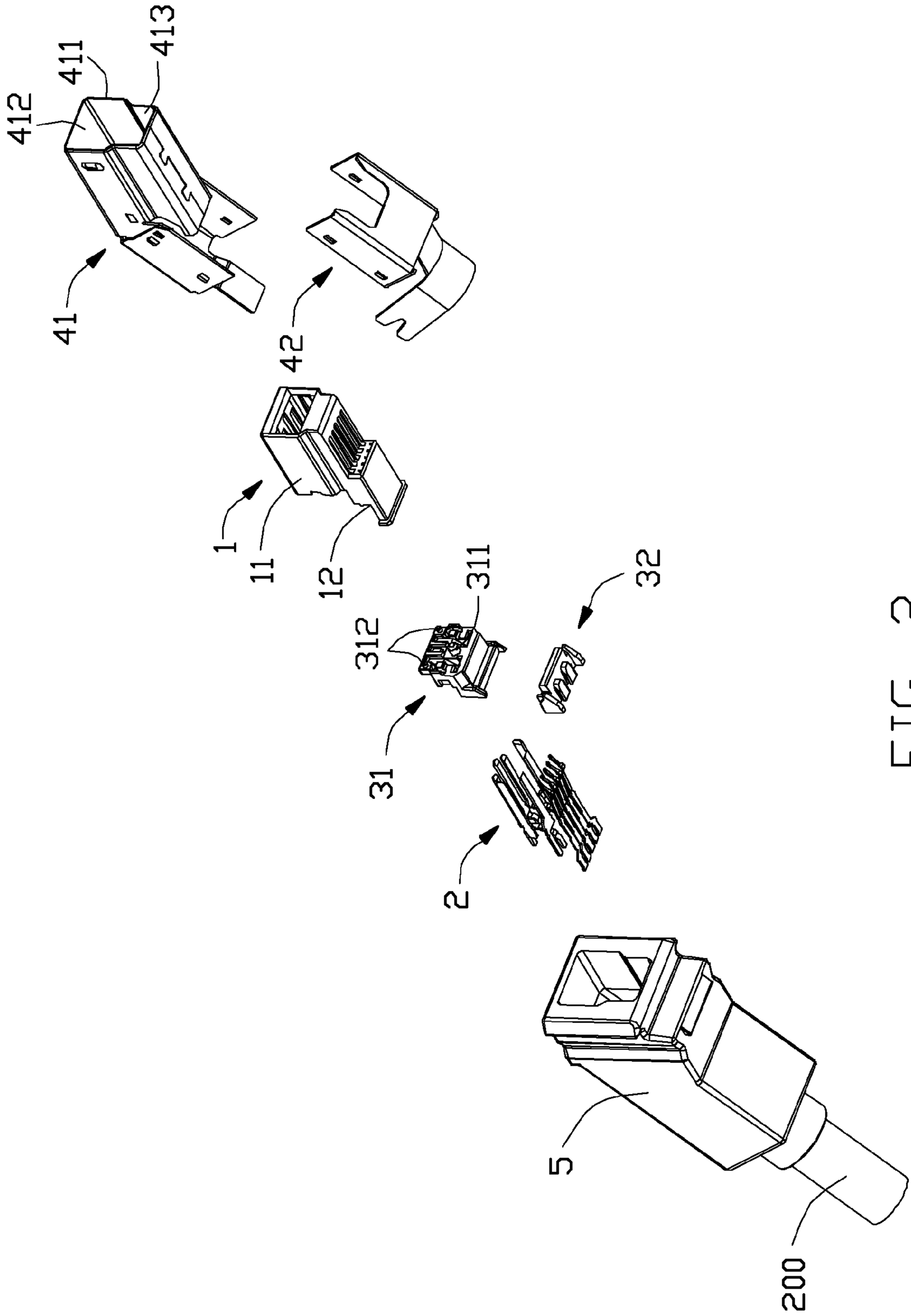


FIG. 2

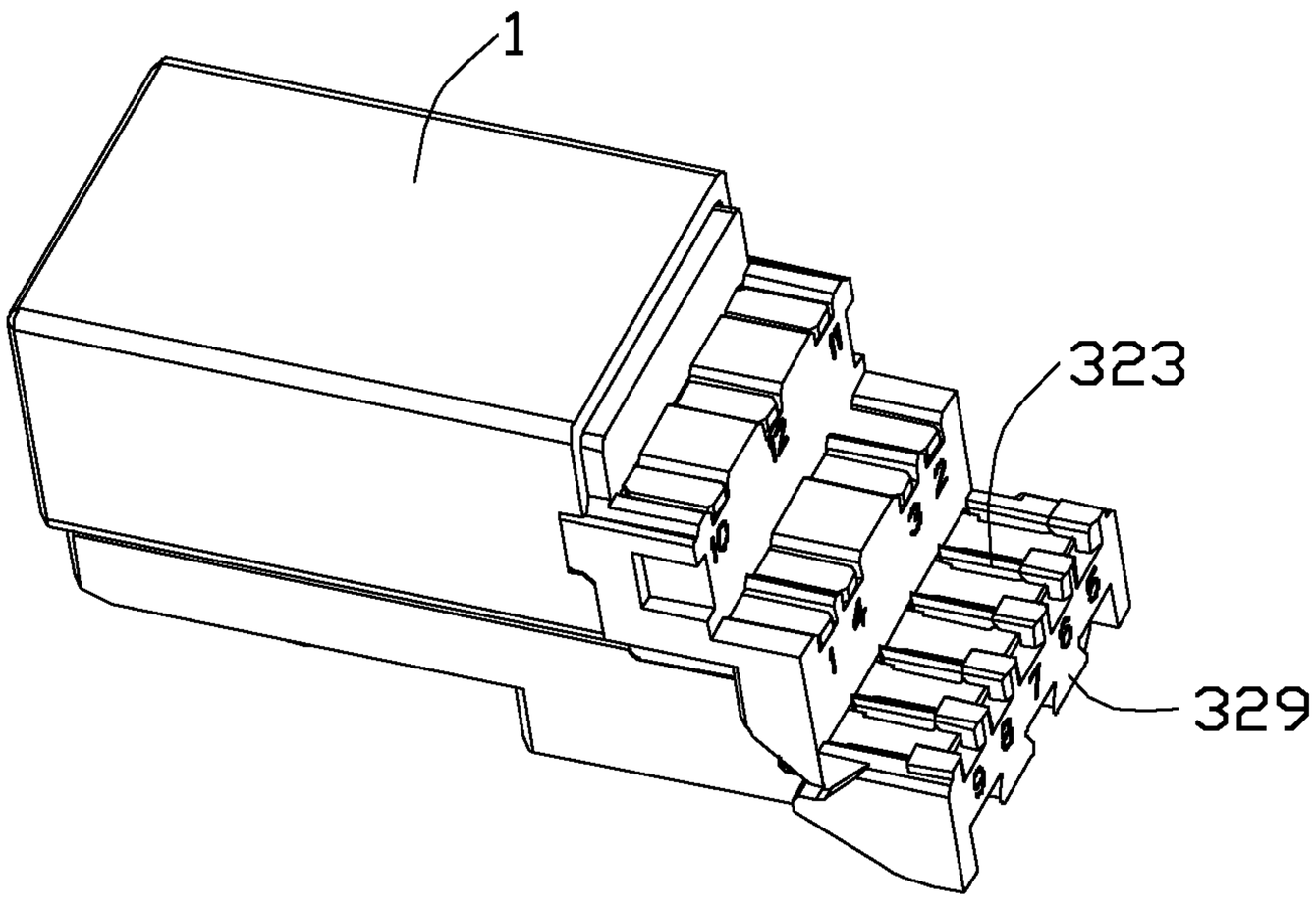


FIG. 3

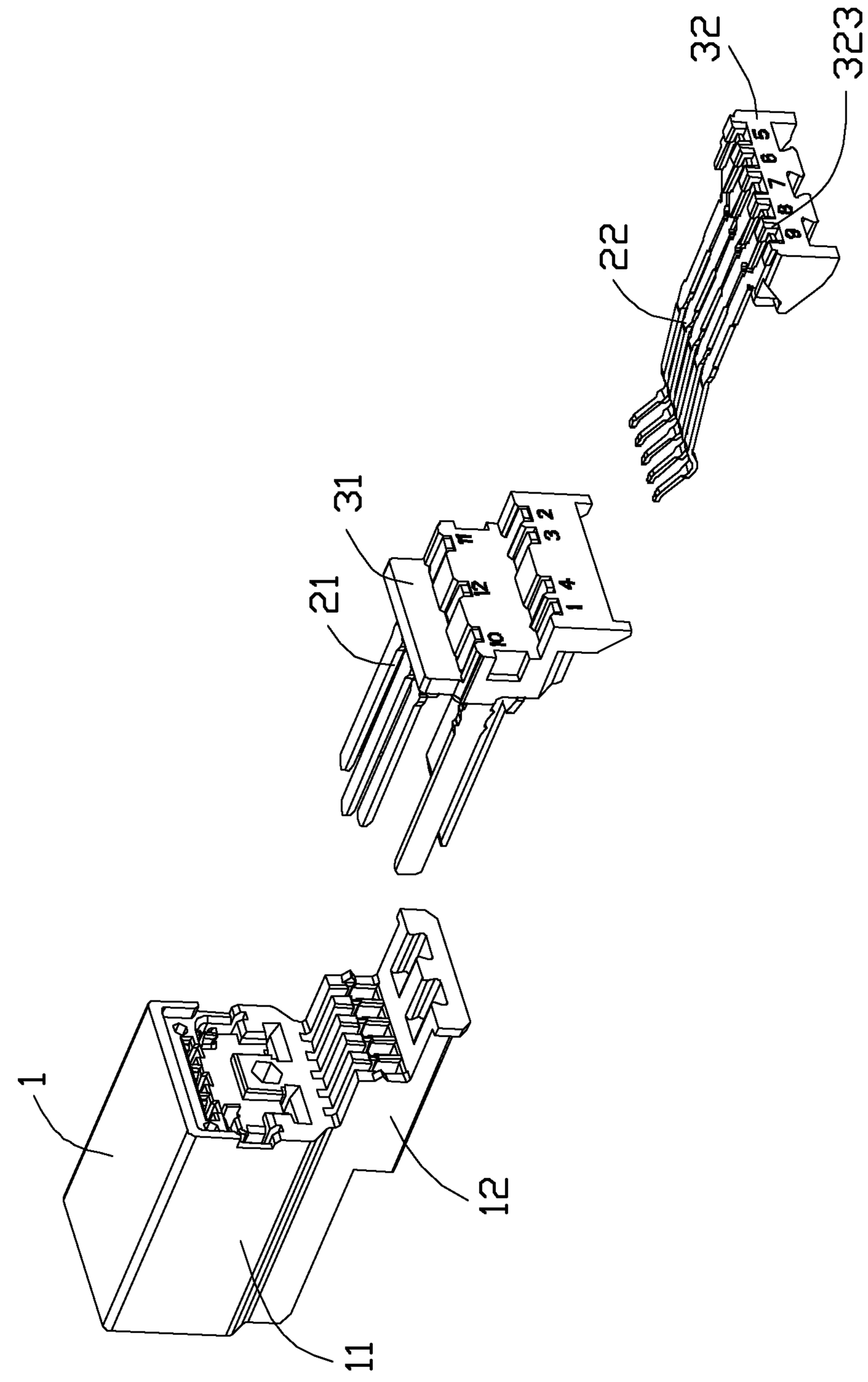


FIG. 4

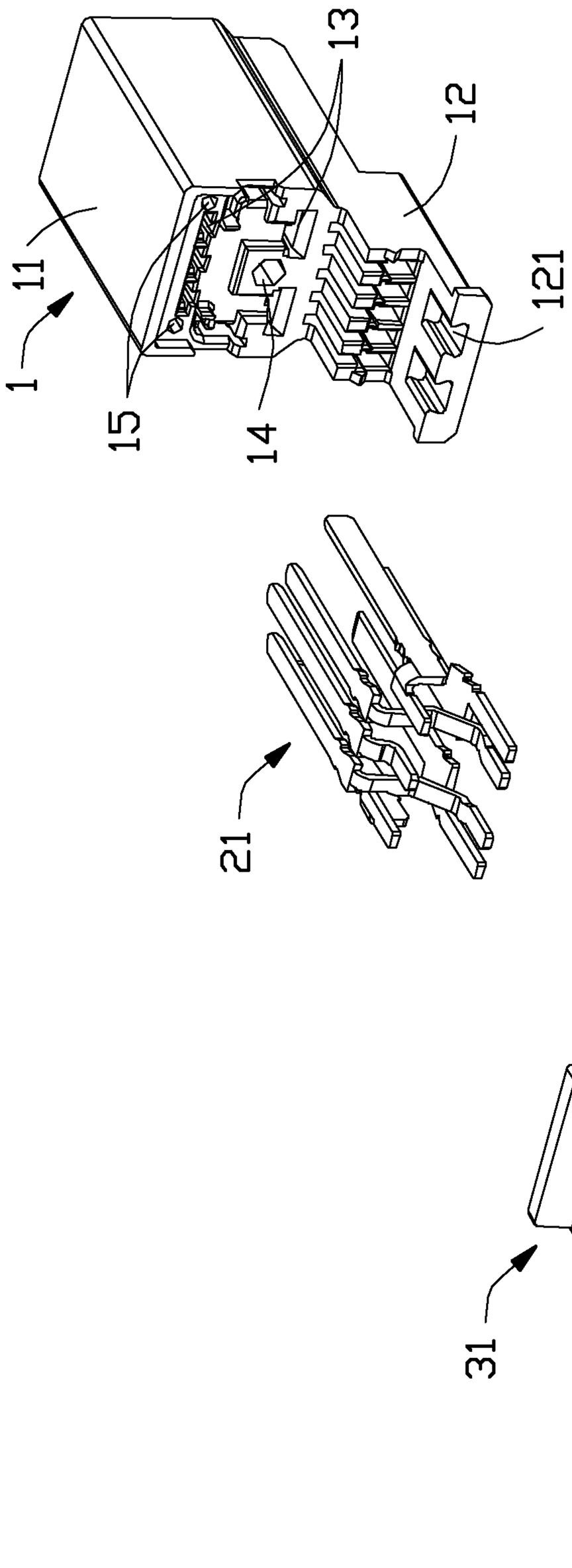

1
11
13
12
121
15
14
21
23
243
242
241
25
22
24
31
321
323
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FIG. 5

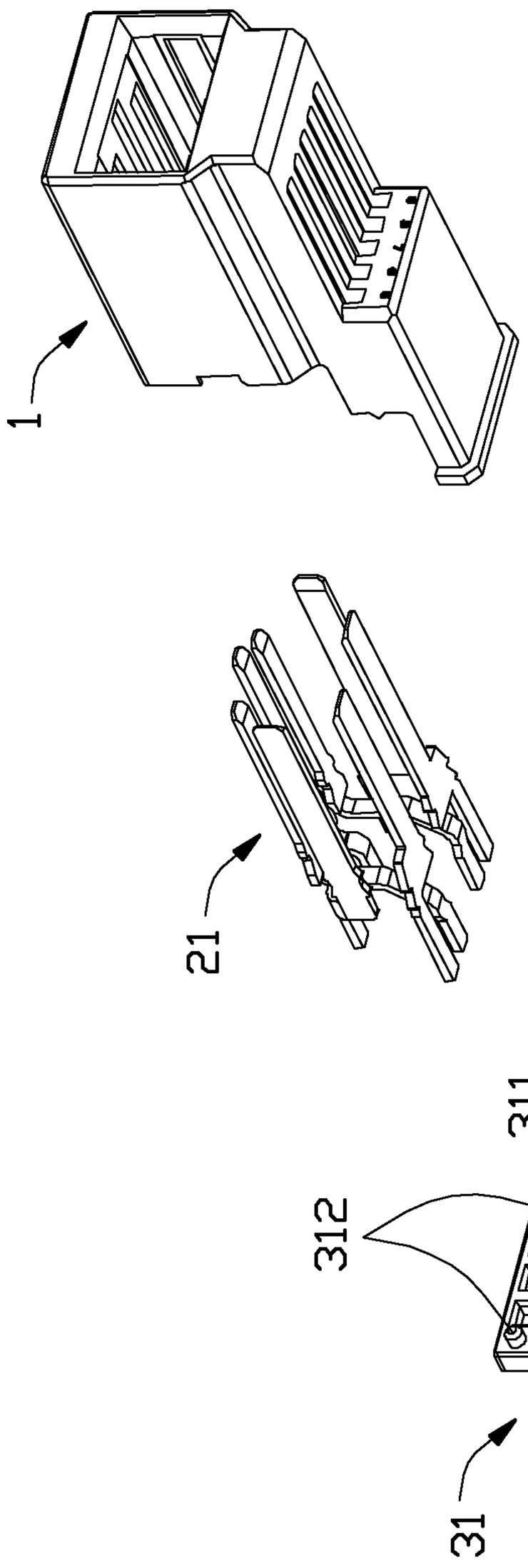

FIG. 6

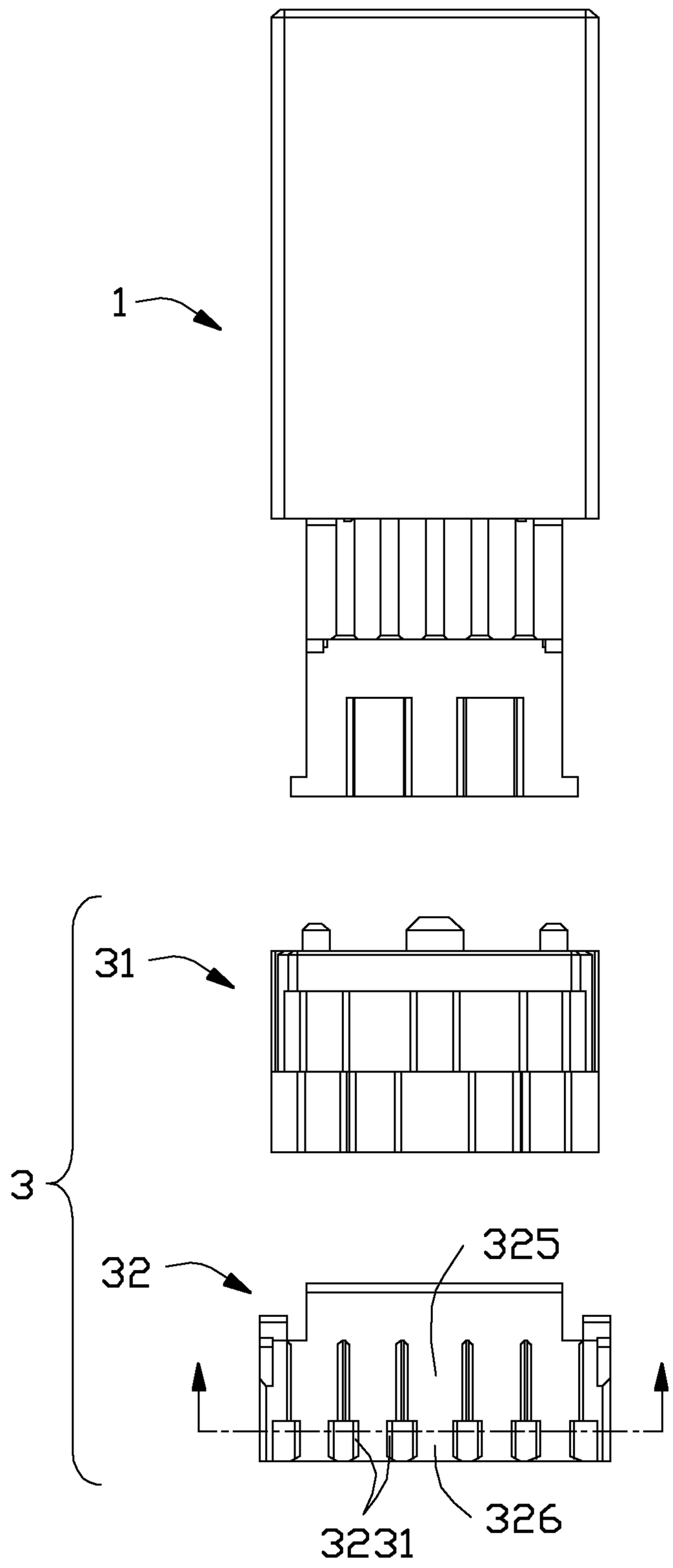

FIG. 7

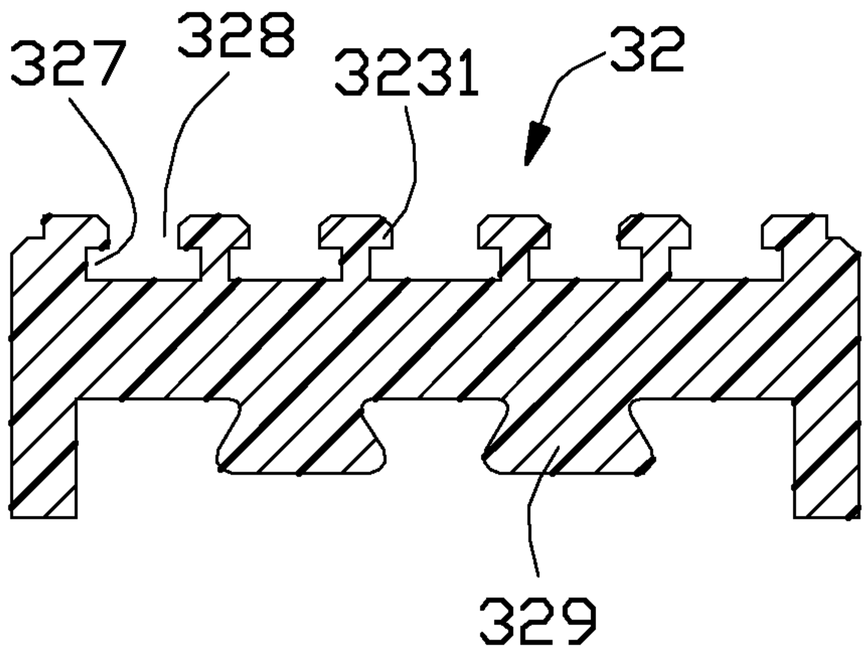

FIG. 8

CABLE CONNECTOR WITH LOW IMPEDANCE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a cable connector, and more particularly to the structure of improving the impedance of the cable connector.

2. Description of Related Arts

China Patent No. 203481460, issued on Mar. 12, 2014, discloses an electrical connector including an insulative body, a number of terminals received in the insulative body, a cable electrically connected to the corresponding terminals, and a spacer assembled to the back end of the insulative body. The cable comprises a number of core wires. Each terminal comprises a soldering portion soldered to a corresponding core wire. The spacer has a plurality of grooves for receiving the soldering portions of the terminals. A T-shaped separator is disposed between every two neighboring grooves, and the soldering portions of the terminals are restrained in corresponding grooves by corresponding separators. The T-shaped separator prevents the soldering portion from moving upwardly. The grooves, however, limit the sizes of the terminals and the core wires, thus resulting in increase of the impedance of the terminals and the core wires. U.S. Pat. No. 7,695,318, issued on Apr. 13, 2010, discloses a plug connector including terminals so received in positioning slots that the terminals are prevented from moving rearwardly.

An improved cable connector is desired to offer advantages over the related art.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a cable connector, and more particularly to a cable connector having a structure for reducing the impedance of the position of the terminals soldered with the cable.

To achieve the above-mentioned object, a cable connector for soldering to a cable defining some core wires includes an insulative body, a plurality of terminals, and a spacer. Each terminal includes a soldering portion extending rearwardly out of the insulative body soldering to the core wires. The spacer includes some stalls and a respective receiving slot formed between every two adjacent stalls for receiving the soldering portions. The receiving slot includes a first receiving slot proximal to the insulative body and a second receiving slot distal from the insulative body. The second receiving slot includes a lower receiving space and an upper receiving space with a smaller width. The soldering portion of the terminal includes a first portion received in the lower receiving space and a second portion received in the first receiving slot. The width of the first portion is larger than the width of the second portion to reduce the impedance.

According to the present invention, the spacer of the cable connector includes the structures of the stalls and the stopping wall. The stalls and the stopping wall limit part of the terminal in the receiving slot to prevent the terminal from moving upwardly or rearwardly. It guarantees the cable connector work effectively. Increasing the width of the terminals and the distance between the stalls to make the terminals can be soldering with the core wires which having larger diameter, and the impedance of the position of the cable and the terminals will reduce.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a perspective view of a cable connector in accordance with the present invention;

FIG. **2** is an exploded view of the cable connector as shown in FIG. **1**;

FIG. **3** is a perspective view of the insulative body, the terminals and the spacer of the cable connector as shown in FIG. **1**;

FIG. **4** is a partly exploded view of the insulative body, the terminals and the spacer of the cable connector as shown in FIG. **3**;

FIG. **5** is an exploded view of the insulative body, the terminals and the spacer of the cable connector as shown in FIG. **3**;

FIG. **6** is another exploded view of the insulative body, the terminals and the spacer of the cable connector as shown in FIG. **5**;

FIG. **7** is a top view of the insulative body and the spacer of the cable connector as shown in FIG. **1**; and

FIG. **8** is a cross-sectional view of the cable connector taken along line **8**-**8** of FIG. **7**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference will now be made in detail to some preferred embodiments of the present invention.

Referring to FIGS. **1** to **2**, a cable connector **100** for soldering to a cable **200** defining a number of core wires (not shown) comprises an insulative body **1**, a plurality of terminals **2** received in the insulative body **1**, a spacer **3** mounting behind the insulative body **1**, a metal shell **4** enclosing the insulative body **1**, and an insulative housing **5** molding to the metal shell **4**.

Referring to FIGS. **3** to **6**, the insulative body **1** comprises a main portion **11** and a extending portion **12** extending toward the cable **200** from the main portion **11**. The extending portion **12** has a shape of ladder. The insulative body **1** comprises a plurality of terminal holes **13** inserted by the terminals **2**. The extending portion **12** of the insulative body **1** comprises a fan-shaped slot **121**. A face of the insulative body **1** mating with the spacer **3** comprises a first mounting hole **14** and a pair of second mounting holes **15** recessing inwardly. Two sides of the first mounting hole **14** are each disposed a second mounting hole **15**. The first mounting hole **14** and the second mounting holes **15** form a triangle to enable the spacer **3** to be mounted on the insulative body **1** more stably.

The terminals **2** comprise a plurality of first terminals **21** and a plurality of second terminals **22**. Each second terminal **22** comprises a contacting portion **23** received in the insulative body **1** for contacting with a mating connector (not shown), a soldering portion **24** extending rearwardly out of the insulative body **1** for soldering to the core wires, and a connecting portion **25** connecting the contacting portion **23** and the soldering portion **24**. In this embodiment, a width of the soldering portion **24** is increased to be larger than or equal to 0.95 mm. The soldering portion **24** of the second terminal **22** comprises a first portion **241** proximal to the cable **200**, a second portion **242** distal from the cable **200**, and a third portion **243** extending toward the insulative body **1**. The width of the first portion **241** is larger than the width of the second portion **242** to reduce the impedance. The width of the third portion **243** is larger than the width of the second portion **242** so that the third portion **243** can close the terminal hole **13** after the terminal **2** is inserted into the terminal hole **13**.

The spacer **3** is mounted on the extending portion **12** of the insulative body **1**. The spacer **3** comprises a first spacer **31** and a second spacer **32**. The first terminals **21** are held in the first spacer **31** and the second terminals **22** are held in the second spacer **32**. The first spacer **31** comprises a first mounting post

311 mating with the first mounting hole **14** and a pair of second mounting posts **312** mating with the second mounting holes **15**. The second spacer **3** comprises an upper face **321** and an opposite lower face **322**. The upper face **321** projects upwardly to form a plurality of stalls or partitions **323**. A receiving slot **324** is formed between adjacent stalls **323**. The soldering portions **24** of the second terminals **22** are received in the corresponding receiving slots **324**.

The receiving slot **324** comprises a first receiving slot **325** proximal to the insulative body **1** and a second receiving slot **326** distal from the insulative body **1**. The width of the first receiving slot **325** is larger than or equal to the width of the first portion **241** of the second terminal **22** so that the first portion **241** can be inserted into the second receiving slot **326** from the first receiving slot **325**. Referring to FIG. **8**, the second receiving slot **326** comprises a lower receiving space **327** and an upper receiving space **328** with a smaller width. The second portion **242** is received in the first receiving slot **325**. Referring to FIG. **7**, the first portion **241** of the soldering portion **24** is received in the lower receiving space **327** of the second receiving slot **326**. The width of the first portion **241** of the soldering portion **24** is larger than the width of the upper receiving space **328**, and is smaller than the width of the width of the lower receiving space **327** to prevent the soldering portion **24** from moving upwardly to affect electrical connection of the second terminals **22**.

Each portion of the adjacent stalls **323** proximal to the cable **200** comprises a stopping wall **3231** extending toward each other. The stopping wall **3231** limits the first portion **241** of the soldering portion **24** of the second terminals **22** in the lower receiving space **327** of the second receiving slot **326** to prevent the second terminal **22** from moving upwardly. A distance from the stopping wall **3231** to the upper face **321** of the second spacer **32** is larger than the thickness of the second terminal **22**.

In this embodiment, the width of the stall **323** is reduced to be smaller than or equal to 0.25 mm so that the width of the first receiving slot **325** can be set larger than or equal to 1.05 mm. Correspondingly, the width of the upper receiving space **328** of the second receiving slot **326** on middle portion is increased to be larger than or equal to 0.8 mm and the width of the upper receiving space **328** of the second receiving slot **326** on other portion is increased to be larger than or equal to 0.65 mm. Due to increasing the width of the receiving slot **324** and the width of the soldering portion **24** of the second terminal **22**, the second terminals **22** can be soldered with core wires of larger diameter to reduce the impedance at the junction of the cable **200** and the terminals **22**.

The lower face **322** of the second spacer **32** projects outwardly to form a projection **329**. The projection **329** is fan-shaped. The projection **329** is inserted and held in the fan-shaped slot **121** to fix the second spacer **32** in the insulative body **1** stably.

The metal shell **4** comprises a first housing **41** and a second housing **42** latching with the first housing **41**. The first housing **41** comprises a mating portion **411** extending toward the mating connector. The mating portion **411** comprises a first receiving room **412** and a second receiving room **413** with different widths. The first terminals **21** are partly received in the first receiving room **412**, and the second terminals **22** are partly received in the second receiving room **413**.

The cable connector **100** is assembled by: inserting the terminals **2** into the insulative body **1**; mounting the spacer **3** to the extending portion **12** of the insulative body **1**, specifically, the first mounting post **311** of the first spacer **31** being aligned to the first mounting hole **14** of the insulative body **1** and the second mounting posts **312** being aligned to the second mounting hole **15**; inserting the second spacer **32**, the projection **329** being held in the fan-shaped slot **121**; soldering the core wires of the cable **200** to the terminals **2**; assembling the metal shell **4** to enclose the insulative body **1**; and molding the insulative housing **5** to enclose partly the metal shell **4**.

It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A cable connector for soldering to a cable defining a plurality of core wires, comprising:

an insulative body;

a plurality of terminals received in the insulative body, each terminal comprising a soldering portion extending rearwardly out of the insulative body for soldering to the core wires; and

a spacer mounting behind the insulative body, the spacer comprising a plurality of stalls and a respective receiving slot formed between every two adjacent stalls, the receiving slots receiving the soldering portions; wherein

the receiving slot comprises a first receiving slot proximal to the insulative body and a second receiving slot distal from the insulative body, the second receiving slot comprising a lower receiving space and an upper receiving space with a smaller width; and

the soldering portion of the terminal comprises a first portion received in the lower receiving space of the second receiving slot and a second portion received in the first receiving slot, the width of the first portion being larger than the width of the second portion to reduce the impedance; wherein the adjacent stalls each comprise a respective stopping wall extending toward each other, the stopping wall preventing the first portion of the soldering portion in the lower receiving space of the second receiving slot from moving upwardly; wherein the width of the second portion of the terminal is smaller than the width of the first portion; wherein the width of the first receiving slot is larger than or equal to the width of the first portion of the terminal to enable insertion of the first portion into the second receiving slot from the first receiving slot.

2. The cable connector as recited in claim **1**, wherein the insulative body comprises a plurality of terminal holes receiving the terminals, and the soldering portion of the terminal comprises a third portion extending to the insulative body, the width of the third portion being larger than the width of the second portion to close the terminal hole.

3. The cable connector as recited in claim **1**, wherein the spacer comprises an upper face, the stalls projecting outwardly from the upper face of the spacer, a distance from the stopping wall to the upper face being larger than the thickness of the terminal.

4. The cable connector as recited in claim **3**, wherein the spacer comprises a first spacer and a second spacer, and the terminals comprise a plurality of first terminals held in the first spacer and a plurality of second terminals held in the second spacer.

5. The cable connector as recited in claim **4**, wherein the stalls are disposed on the second spacer.

6. The cable connector as recited in claim 4, wherein the first spacer comprises a first mounting post, and the insulative body comprises a first mounting hole mating with the first mounting post.

7. The cable connector as recited in claim 6, wherein the first spacer comprises a pair of second mounting posts, and the insulative body comprises a pair of second mounting holes mating with the second mounting posts, the three mounting posts forming a triangle.

8. An electrical connector comprising:

an insulative housing defining a plurality of passageways side by side arranged with one another along a transverse direction and each of said passageways extending along a front-to-back direction perpendicular to said transverse direction;

an insulative spacer attached behind the housing and including a plurality of partitions extending along the front-to-back direction with a plurality of receiving slots each between every adjacent two partitions, a rear portion of each of said partitions further including a stopping wall extending toward the neighboring partition with a distance so as to form a first width between the corresponding opposite stopping walls in the transverse direction around a rear end of each receiving slot while a remaining portion of the receiving slot having a second width larger than the first width, the receiving slots corresponding to the passageways with a one-to-one manner while a pitch of the receiving slots being larger than that of the passageways; and

a plurality of terminals side by side arranged with one another along said transverse direction, each of said terminals including a front section extending into the corresponding passageway and a rear soldering portion receive within the corresponding receiving slot; wherein

the solder portion includes opposite front and rear sections with therebetween in the front-to-back direction a middle section which is adapted to be soldered to a wire, two opposite sides of said rear section being retained by the corresponding stopping walls in both the vertical direction and the front-to-back direction, and a width of the middle section being smaller than those of both the front section and the rear section; wherein two opposite sides of the front section is not restricted by the corresponding partitions in both the vertical direction and the front-to-back direction.

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